

Application Serial No. 10/045,628
Response to Office Action dated January 26, 2004

Listing of Claims

1. (Withdrawn) A system for rapidly exchanging embolic filters within a vessel, the system comprising:
 - a first embolic filter coupled to a first guide wire;
 - a second embolic filter coupled to a second guide wire; and
 - a multiple lumen delivery and retrieval sheath having multiple lumens, wherein said first and second embolic filters are translatable through said multiple lumens.
2. (Withdrawn) The system of claim 1, wherein each of said embolic filters comprises a blood permeable sac having an opening, whereby emboli enter said embolic filter through said opening and become entrapped within said blood permeable sac.
3. (Withdrawn) The system of claim 2, wherein each of said embolic filters further comprises a support hoop which forms a mouth or proximal opening of said blood permeable sac.
4. (Withdrawn) The system of claim 3, wherein said support hoop is self-expanding.
5. (Withdrawn) The system of claim 4, wherein said support hoop has a preformed shape.

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6. (Withdrawn) The system of claim 5, wherein said support hoop is composed of nitinol.
7. (Withdrawn) The system of claim 3, wherein said support hoop is mounted on a suspension strut, whereby said suspension strut is attached to said guide wire at a location proximal to said support hoop.
8. (Withdrawn) The system of claim 1, wherein each of said multiple lumens has an inner wall and an outer wall.
9. (Withdrawn) The system of claim 8, wherein each of said inner walls is coated with a hydrophilic coating.
10. (Withdrawn) The system of claim 8, wherein each of said outer walls is coated with a hydrophilic coating.
11. (Withdrawn) The system of claim 1, wherein said multiple lumen delivery and retrieval sheath is comprised of at least two lumens.
12. (Withdrawn) The system of claim 11, wherein said at least two lumens are dimensioned such that when disposed therein, said embolic filters are restrained in a low profile position.

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13. (Withdrawn) The system of claim 11, wherein said at least two lumens are dimensioned such that said embolic filters, when filled with emboli, may be at least partially withdrawn in said lumens such that emboli contained in said embolic filters is retained therein.

14. (Withdrawn) The system of claim 11, wherein the distal ends of said at least two lumens terminate at substantially the same point.

15. (Withdrawn) The system of claim 11, wherein the distal end of at least one of said at least two lumens terminates proximally of the distal end of at least one other of said at least two lumens.

16. (Withdrawn) The system of claim 1, wherein said delivery and retrieval sheath is comprised of at least three lumens.

17. (Withdrawn) The system of claim 16, wherein at least one lumen of said at least three lumens is so dimensioned such that an interventional therapeutic or diagnostic device and/or a stent can be advanced therethrough.

18. (Withdrawn) The system of claim 16, wherein the distal end of at least one of said at least three lumens terminates proximally of the distal ends of at least two other of said at least three lumens.

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19. (Withdrawn) The system of claim 1, wherein said multiple lumen delivery and retrieval sheath is further comprised of a radiopaque material.

20. (Withdrawn) The system of claim 19, wherein said radiopaque material is selected from the group consisting of a platinum coil, platinum band, platinum marker and barium sulfate.

21. (Withdrawn) A method of rapidly exchanging embolic filters in a vessel, comprising the steps of:

providing a multiple lumen delivery and retrieval sheath having a first embolic filter coupled to a first guide wire disposed within a first lumen;

advancing said multiple lumen delivery and retrieval sheath to a target site within a vessel;

deploying said first embolic filter within said vessel;

collecting emboli in said first embolic filter;

advancing a second embolic filter coupled to a second guide wire through a second lumen of said multiple lumen delivery and retrieval sheath; and

exchanging said first embolic filter with said second embolic filter within the vessel.

22. (Withdrawn) The method of claim 21, wherein said exchanging comprises withdrawing said first embolic filter at least partially into said first lumen and deploying said second embolic filter within said vessel.

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23. (Withdrawn) The method of claim 21, further comprising the steps of collecting emboli in said second embolic filter and withdrawing said second embolic filter at least partially into said second lumen.

24. (Withdrawn) The method of claim 21, further comprising advancing a third embolic filter through said multiple lumen delivery and retrieval sheath.

25. (Withdrawn) The method of claim 24, wherein said third embolic filter is advanced through a third lumen.

26. (Withdrawn) The method of claim 24, wherein said third embolic filter is advanced through said first lumen.

27. (Withdrawn) The method of claim 24, further comprising deploying said third embolic filter in said vessel.

28. (Withdrawn) The method of claim 23, further comprising the step of withdrawing said multiple lumen delivery and retrieval sheath from said vasculature.

29. (Withdrawn) The method of claim 21, further comprising advancing an interventional therapeutic or diagnostic device and/or a stent to the site of the stenosis to perform an interventional procedure thereon.

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30. (Withdrawn) The method of claim 29, whereby said interventional therapeutic or diagnostic device and/or a stent is advanced to said stenosis through a third lumen of said delivery and retrieval sheath.

31. (Withdrawn) The method of claim 30, further comprising performing an interventional procedure within said vessel.

32. (Withdrawn) The method of claim 31, whereby said interventional procedure is performed with said multiple lumen delivery and retrieval sheath in the vasculature.

33. (Withdrawn) A kit for rapidly exchanging embolic filters within a vessel, comprising:

at least one embolic filter assembly, wherein said embolic filter assembly comprises an embolic filter operatively coupled to a guide wire; and
and at least one multiple lumen delivery and retrieval sheath.

34. (Withdrawn) The kit of claim 33, further comprising one or more vascular interventional systems.

35. (Withdrawn) The kit of claim 34, wherein said one or more vascular interventional systems are selected from the group consisting of an angioplasty system, a

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stent placement system, an atherectomy system, an embolectomy system and a diagnostic system.

36. A filter exchange system, comprising:

an elongate shaft having a proximal end and a distal end, the shaft defining a guide wire lumen and a filter lumen;

a filter assembly including an elongate shaft having a proximal end and a distal end; and

a filter disposed on a filter assembly; wherein the filter assembly is disposed at least in part within the filter lumen.

37. The system in accordance with claim 36, wherein the guide wire lumen is substantially shorter than the filter lumen.

38. The system in accordance with claim 36, wherein the filter lumen has a proximal end and a distal end, the distal end of the filter lumen includes a filter containing region.

39. The system in accordance with claim 38, wherein the filter is disposed within the filter containing region.

40. The system in accordance with claim 38, wherein the guide wire lumen is disposed proximally and distally of the filter containing regions, the filter containing

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region has a larger luminal diameter than an alternate portion of the filter lumen; and the guide wire lumen is at least in part discontinuous at the filter containing region.

41. The system in accordance with claim 36, wherein a guide wire is disposed in a guide wire lumen.

42. (Withdrawn) A filter exchange system, comprising:
a guide tip having a proximal end and a distal end, said guide tip defining a guide wire lumen therethrough;
a filter wire having a proximal end and a distal end, said guide tip attached at the distal end of said filter wire; and
a filter assembly disposed along the filter wire distally of the guide tip.

43. (Withdrawn) The filter exchange system in accordance with claim 42, wherein the guide tip has a tapered profile.

44. (Withdrawn) The filter exchange system in accordance with claim 42, wherein the guide tip has a tapered profile having a larger diameter portion at the proximal end, and a smaller diameter portion at the distal end.

45. (Withdrawn) The filter exchange system in accordance with claim 42, wherein said filter assembly includes a support hoop connected to a filter, a filter sac and a suspension strut.

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46. (Withdrawn) The filter exchange system in accordance with claim 45, wherein said suspension strut is attached to a portion of the filter wire.

47. (Withdrawn) The filter exchange system in accordance with claim 42, wherein a guide wire is disposable in the guide wire lumen.

48. (Withdrawn) The method of exchanging the guidewire with a filter wire assembly, comprising the steps of:

placing a guidewire in a vessel at a target site;

providing a filter wire assembly, having a proximal end and a distal end, a filter disposed proximate the distal end, and a portion of the filter wire assembly defining a guidewire lumen;

placing the guidewire within the guidewire lumen;

advancing the filter assembly distally into the vessel to the target site; and

removing the guidewire distally from the target site.

49. (Withdrawn) The method in accordance with claim 48, wherein the guidewire lumen is disposed distally of the filter.

50. (Withdrawn) The method of removing a filter while maintaining wire access, comprising the steps of:

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providing a multiple lumen sheath having a filter coupled to a first wire disposed within a first lumen, and a second wire disposed in a second lumen, and the filter being disposed at a target site within a vessel;

advancing the multiple lumen sheath to the target site;

placing the filter into the first lumen; and

removing the filter from the target site.

51. (Withdrawn) The method in accordance with claim 50, further comprising the step of placing the second wire at the target site.

52. (Withdrawn) The method in accordance with claim 51, wherein the second wire is placed at the target site prior to removing the filter from the target site.